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RESEARCH PERSPECTIVES ON CREATIVE INTERSECTIONS

Educating Design Innovation Catalysts Through Design Interventions

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In the increasingly competitive and fast-changing business environment, innovation is a growing necessity. Organisations are seeking to leverage design as one way to deliver more value to their customers, although the use of design to innovate is still an emerging practice.
Individual capability underpins organisational adoption of design and as such the role (education and training) of this individual is currently under investigation – coined the 'design innovation catalyst'. This paper describes a series of design interventions in a case study of a cohort of fifteen participants in an Australian industrial sector, which aimed to provide the foundation to educate participants about the role of design innovation catalysts. Based on this case study this paper makes a series of observations and reflections on the experience of these design innovation catalysts, which form the basis for recommendations to improve the effectiveness of future programs.

keywords: design innovation; design interventions; design innovation catalyst; design-led innovation.

Introduction

The business environment is evolving, in a world where the rate of change is increasing and competition is becoming globalised (Lawrence, 2013). In this context, companies are constantly looking to transform, innovate and differentiate themselves in order to compete in a highly competitive, fast-changing and global market (Prahalad and Ramaskawy, 2004). In Australia, the past two decades have seen uninterrupted growth occur by an average of 3.4 per cent a year (Business Council of Australia, 2014).

Maintaining such growth over the next decade will be challenging in the face of global and local trends. Globally, businesses are facing technology shifts that enable new business models to emerge quickly and challenge incumbent players (Business Council of Australia, 2014). For Australian businesses, the rise of emerging economies in Asia can become a substantial threat to growth. As emerging economies develop, they move up the value chain and get in a position to compete and disrupt the incumbent players from advanced economies such as Australia (Business Council of Australia, 2014). In such an environment, Australian businesses would put themselves at risk if they solely focus on growing through a focus on productivity (Business Council of Australia, 2014). A new approach is needed to stimulate growth in this evolving market. This provides an opportunity for design to help guide organisations and sectors through a transformative change in order to meet the needs of the future.

Globally, design is increasingly being recognised as an approach to innovation for solving complex problems and as a way to create new value for business and industry when tackling wicked problems in volatile, uncertain, complex and ambiguous environments (Bucolo & Wrigley, 2014). Design can offer a different way of thinking, doing and approaching problems which is valuable for business as it is being seen as the key driver for greater productivity, more efficient and effective products and marketing leading to long-term business sustainability and competitive advantage (Wrigley, 2016). Previous research by Bucolo, Wrigley and Matthews (2012) has stated design-led innovation (DLI) is a methodology to compliment the undertaking of other approaches such as focusing on deep customer insights, which are expanded through customer and stakeholder engagements to explore possible solutions and approaches to innovation. Design-led innovation has the intention of increasing top line growth, and building capability ultimately leading to organisational transformation, therefore it was selected a methodology to assist such a sector as one approach to combat their larger issues.

As previous research has looked at DLI within an organisational context when dealing with sector level innovation it has been suggested that ability to scale can arise as one issue. (Peppou, Bucolo & Thurgood, 2016). Wrigley (2016) has introduced the design innovation catalyst to help implement DLI collectively across multiple organisations at once. However, there is still much to uncover regarding how this catalyst should be engaged, trained and upskilled through different design interventions. Therefore this paper seeks to address: how can a limited number of design interventions establish and educate industry-based professionals to become design innovation catalysts in their organisation?

Design Thinking as a Skillset

Design thinking as a skillset is used not only as a problem-solving technique but as a driver of innovation, particularly in the business context through delivering a competitive advantage (Dong, 2014). The process of design thinking is human-centred, creative, iterative and practical which develops differentiation and competitive advantage converting to market opportunity and customer value (Brown, 2008). Buculo, Wrigley and Matthews (2012) describe the value that design thinking can bring to an organisation as a cultural transformation through re-framing problems, solutions and possibilities differently. Over the past decade, design thinking and its link to innovation have matured, leading to its adoption across sectors to build capability, increase productivity and growth (Matthews, Wrigley & Bucolo, 2013).

However, a comprehensive understanding of design thinking needs to be developed in order for it to be most effective. An individual's personal design capacity and capability and their ability to utilise design thinking for innovation are influenced by their mindset. Carlgren (2013) argues that building design capability requires focusing on developing the mindset as well as tools and techniques. This is echoed by Howard, Senova and Melles (2015) who state "presenting design thinking as a skill or tool set leads organisations to consider and use design thinking in this one particular way without understanding the nuances of how to apply design thinking in practice" (p. 186). Collins (2013) develops this notion further, believing that design thinking should be viewed as a paradigm shift within the organisation rather than a replication of processes and methodology to solve problems as this has resulted in a low commercial success rate (p. 39).

The individual's mindset to the approach of design thinking when building design capability is discussed little within the literature and there is a limited understanding of how this mindset is developed and fostered (Howard, Senova & Melles, 2015). As this appears to be an important factor for cultural organisational transformation to occur through DLI it raises questions of how this can be built and advanced within individuals, especially within the design innovation catalyst.

Design-led Innovation Interventions

Design interventions are implemented to assist organisations in becoming design-led in order to develop long-term organisation culture transformation for competitive gain. Interventions by definition are intended to make something better, the word intervention is derived from the latin word *intervenire* meaning to come between or interrupt.

A review of the literature revealed limited, explicit definitions of what a design intervention is, however, all were consistent that the interventions lead to design being adopted into the organisation's business as usual. Bucolo and

Mathews (2011) relate design interventions to the Danish Design Ladder framework (Kretzschmar, 2003) stating the goal of design interventions "is to enable companies to shift their perspective on the value of design and therefore move back up the ladder over time, from negligible attention to design, to design being critical to the company's success" (p. 4). Niinimaki, Person, Pekkala and Peltonen (2014) state "design interventions are about equipping companies with the knowledge and competence needed to start using design in their development activities by exposing them to the work practices of designers" (p. 1845). Both explanations are consistent with design interventions being implemented within organisations to facilitate the incorporation of design to lead to innovative practice.

Mestre (2015) developed a design action intervention approach, which was characterised by "experimentation, participation and the development of understanding" (p. 190). Through the development of this approach, Mestre explains that "more and more design researchers and academics are working on developing practice-based research projects in cooperation with industries to promote the development of new sustainable products and services" (p. 190). Design-led innovation interventions follow the nine-step DLI framework and are implemented through embedded, practice- led research projects (Bucolo, Wrigley and Matthews, 2012).

DLI takes design thinking and the method of design for business models and processes, requiring an open and questioning mindset from the organisation which can be promoted, facilitated and sustained by the intervention of a design innovation catalyst (Buculo,

Wrigley & Matthews, 2012; Wrigley, 2016; Matthews & Wrigley, 2011). Wrigley and Buculo (2011) define DLI as "a set of methods which allow the designer to consider and evaluate their design development from multiple perspectives, typically spanning user needs, business requirements and technology demands" (p. 232). DLI is used as a framework to build capability within organisations and add strategic value, as well as increase individuals design capability when solving problems and approaching tasks through integrating deep customer insights into business models to lead to organisational transformation. The stages of DLI, which are used as the foundation of the design interventions in the case study are outlined in Table 1 (adapted from Thurgood, Dorst, Bucolo, van der Bijl-Brouwer & Vermaas, 2015).

Table 1. Design-led Innovation Intervention Stages (adapted from Thurgood, Dorst, Bucolo, van der Bijl-Brouwer & Vermaas, 2015).

Stage	**Aims**	**Criteria**
Understanding	An assessment of the current business and its ways of innovating	Understanding should identify: - If strategy is aligned to their customer and business model - Any discrepancies across staff about customers, value propositions, and/or business models
Envisage	An exploration of new possibilities beyond the current business	Envisaging should identify new customers and markets
Empathise	An understanding of the possible problems and emotions of a future customer	Empathise should: - Describe journey before, during, and after proposed/current product or service - Identify customer pain and gain points - Reframe problems
Proposition	A new value proposition based on the assumed needs of a future customer	Proposition should: - Redefine problems at an emotional level - Design out pain points and/or leverage gain points - Narrate problems and solutions from a customer perspective
Provocation	A description of the real meanings behind problems for customers	Provocation should: - Test if assumptions in narratives are true - Reveal meanings and values outside of the problem context - Reframe problems with more focus

Re-design	A new ideal but realistic value proposition and business model that the company will consider	Re-design should create: - Customer-centric and ideal future-state value propositions - Risk-mitigated solutions
Connection	A new strategy to get towards the desired state	Connection should produce business models that identify activities to be stopped, and new activities to be acquired
Alignment	An implementation of actual change	Alignment should implement competitive business models
Empowerment	An assessment of organisational change and capability building	Empowerment should show capability of staff to continually reframe

Design Innovation Catalysts

The purpose of design interventions in this case study was to establish and educate a cohort of industry-based professionals to the role of design innovation catalyst within their organisation. Wrigley (2016) describes the role of the 'design innovation catalyst' (DIC) is to "translate and facilitate design observation, insight, meaning, and strategy for all facets of the organisation" (p. 151). The value of the DIC to an organisation is crucial and a major component of the DIC is the regular interaction with learning-teaching and industry-academia (Figure 1).

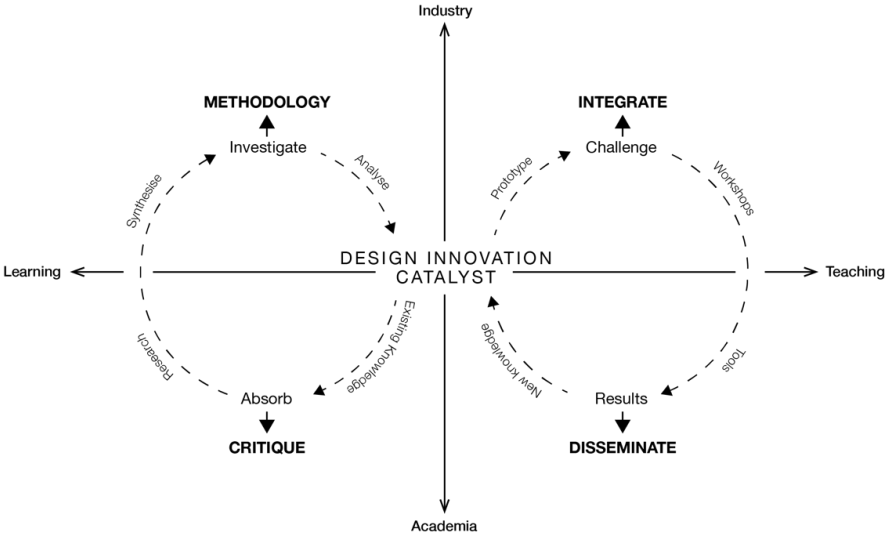

Figure 1. Design Innovation Catalyst Framework (Wrigley, 2016).

Wrigley (2016) defines the four stages of the DIC Framework, which informed each design intervention in the case study and are explained below (p. 52). *Absorb* (bottom left quadrant) refers to the DIC discovering knowledge and theory, critiquing and questioning existing research, case studies and business models within a learning environment. DICs *investigate* (top left quadrant) their current organisation and gather insights and information for their current project within the organisation. DICs *challenge* (top right

quadrant) current ways of working within the organisation, generate discussion, debate and tensions to challenge and explore new possibilities. The *results* (bottom right quadrant) occur when the findings of the project are disseminated and contribute to the academic research field.

Howard (2012) states that design thinking as a capability is best acquired through practice, application and experience. The skills, capability and mindset required of the DIC are crucial to their success within the organisation. Dorst (2015) defines this as seven general levels of design expertise and ways of design thinking, moving from the first, *Naïve* to the seventh, *Visionary* (p. 57). Dorst goes on to define the second level, *Novice* as convention based, exploring what design is and getting to know it "as a series of activities that are organised in a formal process" (Dorst, 2015, p. 57). Wrigley (2016) suggests the DIC must embody six capabilities: design knowledge and skills, business knowledge and understanding, cognitive abilities, customer and stakeholder centricity, personal qualities and research knowledge and skills. The DIC is still an emerging field and determining how the novice catalyst should be engaged, trained and upskilled through different design interventions is what this case study sought to uncover and build upon.

Case study: Sector Traineeship Program

The organisation we partnered with for this case study is a not-for-profit organisation owned by its members, all independent companies in the sector. This partner organisation runs many programs to stimulate growth in the overall sector, which in turn will benefit its members. Growth opportunities are explored in many manners, for example increasing public awareness to the industry's products, funding research and development that will impact the industry as a whole, exploring existing and new markets to develop deep customer insights.

One of these programs to support the sector is a traineeship initiative in which participants are placed in industry value chains either via full-time placements or on a temporary basis. The traineeship aims to upskill the participants in a number of disciplines that can enable them to stimulate growth within their host company. Participating companies and individuals were subject to a thorough selection process: the participants were asked to have high degrees of qualification (ideally Masters or above) and went through interviews with the partner organisation to assess their motivation and suitability to deliver the expected outcomes over time (Table 2). The traineeship program, which began in June 2016 and is scheduled to end in June 2018, required participants to dedicate 20% of their working time to the traineeship, under the guidance of a mentor within the company (usually their direct manager). They also were required to participate in regular weeklong 'residentials' spread out during the two-year program, as these gatherings were the vehicle used to introduce participants to new learnings and debrief on the previous phase of work (see Figure 2 for an example of three residentials and their content).

Table 2: List and profile of program participants

Participant	Participant's role in the organisation	Participant's highest degree	Participant's tenure in the organisation
A	Innovation officer	Bachelor – Science degree	New starter

B	Factory innovation officer	Bachelor – Science degree	New starter
C	Innovation coordinator	Bachelor – Business degree	New starter
D		Master – Business degree	New starter
E	Innovation officer	Master – Business degree	New starter
F	Project coordinator	Master – Business degree	5 years
G	Innovation partnerships project manager	PhD – Science degree	New starter
H		PhD – Science degree	New starter
I	Business analyst	Master – Business degree	1 year
J	Chief financial officer	Master – Business degree	1 year
K	Management information and supply chain coordinator	Bachelor – Business degree	2 years
L	Product development technologist	PhD – Humanities degree	2 years
M	Product technologist	PhD – Science degree	2 years
N	Customer account manager	Bachelor – Science degree	11 years
O	Product developer	Bachelor – Science degree	4 years

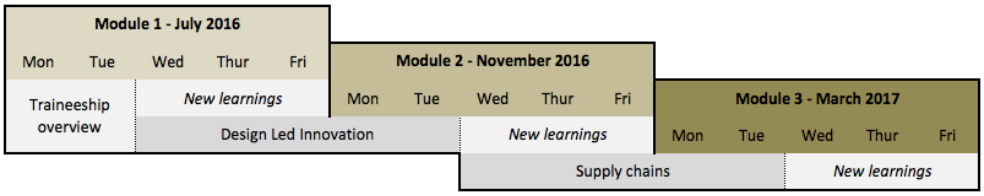

Figure 2. Timeline for the first three residentials of the traineeship program, spanning July 2016 to March 2017

This paper focuses on the first six-month of the traineeship program, which developed the participants' ability to understand, apply and adapt design-led innovation to stimulate growth in their respective business. Following a previous collaboration applying design-led innovation (DLI) to its programs, the partner organisation understood DLI to be a critical skill for emerging leaders to equip themselves in the pursuit of business growth. The design interventions that were delivered over these six months were developed collaboratively with the partner organisation to adapt to the participants' and businesses' constraints. Table 3 below presents an overview of these interventions.

Table 3. Types of intervention with their corresponding aims, medium, tools and stages

Time	Intervention	Aims	Method of Delivery	Tools used	DIC Framework Stages

June 2016	Introductory workbook	Introduce DICs to the program and the opportunity of DLI. Give them tools to practice and a survey to reflect	PDF booklet sent to DICs by the partner organisation	Persona, value chain analysis, value proposition canvas, business model canvas, future customer exploration, five whys	Absorb, investigate
July 2016	DLI Sprint case study workshop	Give DICs a hands-on experience of DLI process and tools to enable them to reflect on how they would apply DLI in their organisation	3-day workshop, part of a week-long residential (following 2 days of introduction to a variety of talks on the latest thinking in the industry)	Persona, value chain analysis, value proposition canvas, business model canvas, future customer exploration, journey map, SPICE model, narrative development, customer interview, cluster synthesis, NADI model, experiment card	Absorb
July – November 2016	Project support	Guide DICs individually through their DLI project, adapting their activities to their progress and challenges	On-demand 30 to 60-minute phone calls	Focal question, persona, journey map, experiment card	Investigate, Challenge, Absorb
October - November 2016	Progress assessment and reflection	Provide in-depth support to DICs and get additional context to their project (visit site, meet mentors) to plan next steps	On-site half-day visit	Review of previous tools' application	Absorb

November 2016	Debrief workshop	Reflect collectively on the learnings of individual projects, and plan next phase of work	2-day workshop, part of a week-long residential (followed by 3 days on supply-chain innovation)	How Might We framing question, IDEO method cards	Absorb

The process – design interventions

The goal of the interventions was to establish and educate the participants to become Design Innovation Catalysts (DICs) within their business. Each intervention covers one or more stages of the Design Innovation Catalyst Framework presented in Figure 1.

1. Workbook

The first intervention with the trainees at the commencement of their two-year program was a workbook introducing them to the purpose of the program and their first new discipline to be explored over the following six months: design-led innovation.

This workbook was sent to all DICs enrolled in the program, some being new starters in their organisations while others had the long tenure in their role. Following their successful application to the program, this was the first official document about the program that the DICs received.

The workbook aimed to grow the DICs interest in design-led innovation, and prepare them to enter the DLI Sprint case study workshop with a better understanding of (and ability to question) the content they would be working through. The workbook was structured in four sections:

1. Explain the opportunity for the sector to grow by focusing on creating value for its customers, rather than keep focusing on production efficiency – an opportunity they can either seize or opt-out of
2. Introduce DLI's core concepts and the process that will be used during the DLI Sprint case-study workshop
3. Introduce some DLI tools (listed below) to be used prior to the DLI Sprint case study workshop, with the double aim to help DICs gain better understanding of their organisation and give them a first-hand experience of engaging others in a design activity
4. Stimulate self-reflection through a series of questions associated with the DICs' intended project focus and their experience using the tools provided in the previous section

The workbook provided examples and templates to complete a persona (Prahalad & Ramaswamy, 2004), a value-chain analysis investigating the entire range of activities required to bring a product or service from initial conception through to its final disposal after use (Kaplinsky, 2000), a value proposition canvas (Osterwalder, Pigneur, Bernarda, Smith & Papadakos, 2014), a business model canvas (Osterwalder & Pigneur, 2010), a future customer exploration (Wrigley, Bucolo & Straker, 2016; Wrigley & Straker, 2016) and a 'five whys' exploration of a problem (Serrat, 2010).

DICs were asked to come to the workshop with their completed tools and reflection surveys, pushing them to learn not only through absorption of academic content but also through investigation within their business.

2. DLI Sprint Workshop

The three-day DLI Sprint workshop aimed to guide the trainees through a mock case study, by following the DLI process and applying relevant tools. After each phase of work, the DICs were asked to reflect on how they would contextualise the process and tools to their individual organisation and project. The aim of this was to help the DICs develop a personalised DLI project plan by the end of the workshop.

The DLI Sprint followed two days of introduction to the broader traineeship program, as this was effectively the kick-off of the program and the first time that DICs met. Some DICs were travelling from across the country, taking time out of their business-as-usual activities. From a Chief Financial Officer of a medium-sized organisation to a sole manager of a small company, this time out was very demanding on DICs.

The workshop followed the DLI Sprint model, an accelerated version of a full DLI program which offers a practical introduction to the principles of design (see Figure 3):

- Day 1: introduction to DLI (theory and example of successful application in the industry); understanding a situation (using a persona, a value-chain analysis, a value proposition canvas, a business model canvas, a journey map [Liedtka, 2011] and a SPICE model); envisaging an ideal future (through future customer exploration and future journey maps)
- Day 2: reflection and discussion about their DLI project (handing out a proposed project timeline for them to rework throughout the workshop); exploring the future (narrative development [Beckman & Barry, 2009] to test assumptions and provocations through customer interviews)
- Day 3: exploring the future (cluster synthesis of interview outcomes, then Needs and Aspirations for Design and Innovation (NADI) analysis [van der Bijl-Brouwer & Dorst, 2014) on the clusters], creating headways to that future (using experiment cards), then recap on design theory, lessons learnt from the workshop and personal reflection on individual DLI project plans

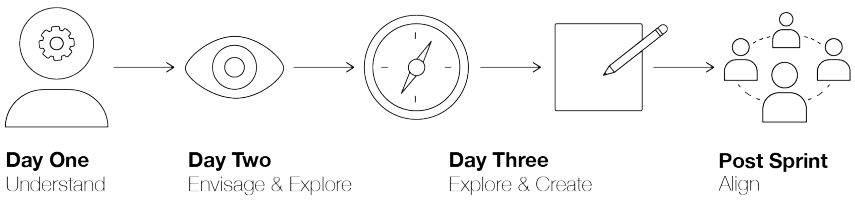

Figure 3: Design-led innovation sprint model

The theory content was light, spread out throughout the sessions and brought to life through activities or group discussions.

The case study focused on a company's challenge from an industry that all DICs could relate to as it was similar to theirs, yet none of them was directly engaged in it. The

premise of the case study was based on DLI projects carried out with similar organisations, as well as desktop research on different innovations occurring in that sector.

Equipped with this new experience and a proposed DLI project timeline, each DIC was asked to reflect on how they would apply DLI on their own project, once back in their organisation. To this end, they had access to individualised support from the workshop facilitators at the end of the workshop, to discuss any project specifics before they returned to 'business-as-usual'.

3. Project Support

Support was made available to DICs through the duration of their DLI project, to provide expert advice on tailoring their project to their needs.

Following the cohort-building residential, each DIC went back to their business to work on their own project, learning through investigation and teaching through challenge within their company. To mitigate the risk of isolation of these DICs within an organisation that might not support their activities, the DICs stayed connected as a group through a social collaboration platform and could call on the support of the DLI facilitators at any time throughout the project.

Support was provided through on-demand phone conversations, ranging from 30 to 60 minutes. The calls were structured to debrief on what work had been done on the DLI project, reflect on the lessons learnt and define the next steps together. This allowed the DICs to disseminate their results to academia. Based on needs identified by the DLI facilitators during the calls, other tools or techniques such as a focal question (Ertel & Solomon, 2014) would be presented for the DIC to absorb, enabling them to progress their project effectively. The demand for support calls was varied, some DICs requesting regular conversations while others were not proactive in seeking support (see Table 4).

4. Progress Assessment and reflection

A more in-depth support mechanism was made available for DICs, spending time with them face-to-face in their premises during a site visit. The aim of this intervention was to better understand their work environment, both physical and hierarchical, to provide tailored advice and support in promoting DLI in their organisation.

These visits were organised at the tail end of their DLI project due to planning constraints. This gave DICs time to progress their project further and have more detailed support needs based on their experiences to date. This also gave them more opportunity to build support from their leadership by challenging them with the approach and results of DLI. The visit was focused on meeting the trainees and ideally their mentor, and was performed by the facilitator as well as a representative of their industry subgroup.

The visits allowed enough flexibility to cater for very different DIC situations (e.g. some were able to organise a site visit or product testing) and varied audience (e.g. some could not get their mentor to attend). The discussions focused on reviewing the DIC's work and challenges to date, discussing their next steps of personal learning and applying design within the organisation, and next steps to scale the use of design within the business.

The visits' content evolved organically, sharing material to absorb based on needs identified in the discussion. For example, one DIC had a high-stakes meeting planned with their new General Manager, which would define the future of her DLI project. In that case, we focused on helping that DIC apply design principles to prepare for this interaction.

The demand for on-site visits was inconsistent: some DICs requested them early, others requested one only when probed, while the last group rejected the offer (see Table 4). All DICs that received a visit appeared to regain confidence in their ability to apply design principles to their project, as the discussions seemed to have broadened their understanding of how design can be adapted to their needs. For some, it was an opportunity to reflect on how DLI could be applied beyond their current project and help address bigger systemic issues in their business.

Table 4: Participant involvement in project support calls and progress assessment and reflection stages

Participant	Number of Project support calls	Request for Progress Assessment and reflection	Number of pivots on the project
A	2	No	0
B	2	No	0
C	3	Yes	1
D	1	No	0
E	1	No	0
F	2	No	1
G	4	No	3
H	1	No	0
I	1	Yes	1
J	2	Yes	1
K	1	No	0
L	1	Yes	0
M	1	Yes	1
N	1	Yes	0
O	2	Yes	2

5. Debrief Workshop

This last intervention in the DLI cycle of the traineeship program was a two-day debrief workshop, aiming to assist DICs in reflecting on their experience and consolidating their new knowledge. The outcome of this cycle would then form the basis for the next cycle of learning.

The two days dedicated to this debrief were the first two of a weeklong residential (the second for the program). This was the second time the DICs met, except in some rare cases where pairs had met between residentials. Business or personal constraints led some of the DICs to drop out of the program (one person), get excused from the entire residential (one person) or join the residential belatedly (three people).

While the debrief was originally planned to be designed and delivered by the DLI facilitators who had accompanied the entire program, an opportunity led the partner organisation to hire IDEO to perform this activity. This change forced the original

facilitators to reflect on the lessons to date in order to perform a hand-over informing the structure and content of the debrief workshop. This was an opportunity to consider the DICs' challenges and reflect on how this last intervention could address these.

The debrief workshop was structured in three phases: first, present and discuss design at IDEO (absorb), then unpack the DICs' design project and experience to date (results), and finally look at how to apply design to each DIC's next phase of work. Explaining what design looks like at IDEO reinforced the messages that DICs had received to date: the principles and values were similar to what they had heard before, the process and messaging was slightly different. The presentation of each person's work to date helped others realise that their struggles were not unique – while in some cases DICs were the ones best able to assist their peers by leveraging shared experiences. In the last phase, DICs were introduced to 'How Might We' framing questions, and to the IDEO Method Cards (a set of fifty-one methods described on cards, split between four categories of 'Ask', 'Look', 'Learn', 'Try'). Using the tools provided, the DICs formed groups of four which had to support each other in shaping the next phase of one another's design project: what is the brief, which three methods will be used to get started, what is the ideal outcome of this phase of work? To enhance these plans, each DIC was given a fifteen-minute time allocation for a one-on-one discussion with an IDEO designer. This enabled a higher quality of project plan through tailored advice.

The outcome of the session was positive, with each DIC reporting a clear plan and customised support, although it is unclear how this plan will evolve in the face of the next phase of learning that was being pushed upon them during the following three days of residential. The ability for DICs to fully adopt design as an underpinning project methodology remains to be demonstrated in the next phases of the traineeship program, as this paper is only a preliminary analysis focusing on the immediate impact of the design interventions.

Observations and insights

The experience of DICs has been fluctuating during this six-month period, between periods of comfort learning new skills, to doubts applying them. Figure 4 schematically represents this experience throughout the journey based on survey and anecdotal responses from DICs.

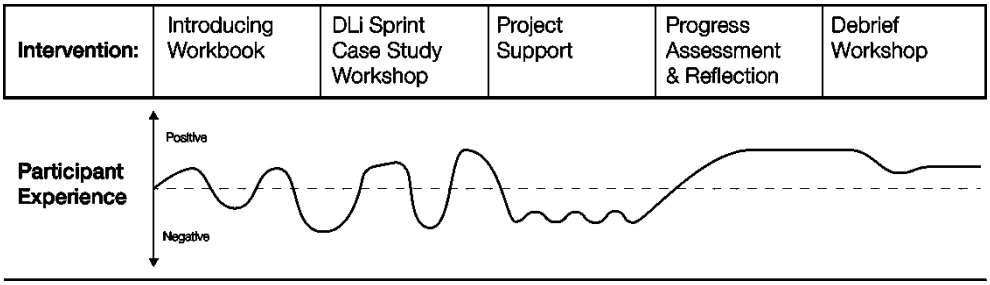

Figure 4: Design innovation catalyst experience during the design interventions

This representation highlights the ups and downs of DIC's perceived experience. We use this to pick out the aspects of the intervention that were well received, and where improvements are proposed based on reflection.

The following aspects of the interventions generated positive reactions from DICs:

- Receiving a workbook that gives them an introduction to design
- Getting face-to-face training and guidance through a case-study example applying design
- Getting tailored advice on-site, and reassurance for their performance to date
- Shaping the next phase of their work by self-selecting methods from multiple options

The following events generated negative reactions from most DICs:

- Being asked to use design tools in their organisation before going through a formal training
- Interviewing customers, even in a mock situation as the DLI Sprint case-study: this was difficult because it led the exercise to become more 'real' and less an exercise in isolation of the external world
- Project development and support, when some DICs sought to follow a step-by-step approach to design and felt that they were not 'performing'
- Debrief workshop that was reiterating many messages and left them in a passive state of consuming messages

Checking these observations against the DIC Framework (Wrigley, 2016), it appeared that the DICs were not comfortable when having to move from learning in academia back to their industry environment, struggling to apply the skills they had absorbed but not fully mastered yet. It also appeared that the DICs were at times challenged when having to absorb then apply a large amount of new content, as had occurred during and after the second intervention.

Establishing and Educating Design Innovation Catalysts

Seeking to address the causes of negative reactions for DICs, the authors sought to find ways to increase the comfort for them to move from academia to industry, and increase the structure and balance between learning and teaching, leveraging the DIC Framework (Wrigley, 2016). To that end, the authors suggest the following:

1. Reinforce the learning goal with DICs and mentors;
2. Manage expectations of DICs and mentors;
3. Focus on mindset rather than process and tools; and
4. Stage and tailor the learning of process and tools

For each of these suggestions, we present a rationale for the recommendation and a proposed method to apply it during a program.

Having clear goals for a series of interventions is critical: in our case, we aimed to establish and educate DICs. Making these goals explicit is equally important to enable a successful outcome of these interventions. Given the technical and industry background of the DICs, their day-to-day focus tends to be on delivery of outcomes: learning can be perceived as a classroom activity, which is then applied once back in the office. This approach transpired in the behaviour of some DICs and was strongly guided by the views of their mentor. Mentors using the program for the DIC to deliver on a pre-existing project with an established deadline skews the outcome focus from learning to delivery. Not addressing this misalignment of goals for the program puts the learning at risk: DICs feel overstretched (applying skills they have not consolidated) and under pressure (expected

to deliver successful outcomes using these skills), which in turn leads to stress, anxiety and more struggle to reflect and learn. Reinforcing the learning goal, and that the learning occurs both inside and outside of classroom environments will give DICs more time and space to assimilate the skillset of design, through practice (Howard, 2012).

One way to reinforce the learning goal is to work before the start of the program with mentors and DICs to ensure they clearly understand what is required to learn design effectively. The recruitment and orientation to a DIC education program is a great opportunity to create alignment, and signals of misalignment should be addressed. Mentors could be given examples of projects adapted (and not adapted) to the learning needs of the DIC. It should also be explicitly stated to mentors that they should consider the program's impact on their resource planning, given the efficiency of the DIC will be reduced during the program.

Going further than reinforcing the learning focus on the program, both DIC and mentor's expectations should be managed at the start of the program. Experience shows that difficult periods are probably for the DIC (practising a new skill that is not mastered), and for the mentor (apparent drop in productivity of DIC while they develop their new skill). Being upfront about these challenges to come can limit the discouragement and frustration that people could experience during such periods. In particular, if DICs expect the formal training to translate directly into applicable skills, they will self-evaluate themselves negatively when investigating and challenging their organisation. For those with a fixed mindset (Dweck, 2009), such perceptions of failure can limit their involvement in future steps. To manage expectation, using a diagram such as an experience map (Figure 4) during orientation to the program can quickly highlight the probable peaks and troughs of DIC and mentor experience over time. This can be an effective vehicle to prompt discussion around the expectations of the program, and how participants expect to deal with challenges throughout this period.

The introduction to design should then strongly focus on the mindset of a designer, steering away from process and tools (Calgren, 2013). Blending both mindset and process does not give sufficient emphasis on the importance of design's adaptive approach to problem-solving. Audiences with a technical background have proven to focus on process and tools, perceiving design as a technical procedure without recognising its non-linear nature (Brunswicker, Wrigley & Bucolo 2013). This focus could be achieved by front-loading the program with a focus on the concepts that underpin design (e.g. empathy, experimentation), mixing theory and case studies. DICs should also be encouraged to reflect on personal examples where a design mindset could have benefited a project they were part of. DICs could also be given exercises to investigate and challenge their organisation's perception of design's underlying concepts, which would help identify potential difficulties in the adoption of design within the business. This work on unpacking and developing the mindset of design should be done prior to sharing any process or tools.

Design process and tools should be the last element presented to DICs, and yet only in a staged and tailored manner. Once the DIC understands the focus of the program on learning, is conscious of the difficulties ahead and appreciates the mindset of design, they are more able to learn how to use design as a process and set of tools in an adaptive manner. Providing an overview of how a design process evolves is necessary to give participants reassurance that there is a degree of structure in design, but care must be taken to stay away from giving a prescriptive approach to applying the design. Staging and

tailoring the reveal of these process and tools enables the facilitators to adapt the material to the particular needs of the DIC, without limiting the absorption of knowledge to a pre-defined set of steps and tools.

This can be done by familiarising DICs with the main steps of a design process, the objective of each step, criteria to move forward and types of tools that can be used. Based on this, facilitators should work with DICs to develop a personal project plan where only the first step of the plan will be mapped and tools selected. Once this plan enacted, DICs can check back with the facilitator to debrief on the work done and define their next steps. This would enable just-in-time learning for DICs, and a tailored approach to design which benefits from the experience of facilitators. This would suggest future work to further explore these findings in order to improve the learning experience and hence the outcomes of the design innovation catalysts.

Summary

Shaping design innovation catalysts with a limited amount of interactions is a challenge, which pushes facilitators to reconsider what is the core knowledge that needs to be passed on: the design mindset, its approach to problems or its process and tools? While this case study is only a preliminary analysis of the full traineeship program, the observations and insights presented in this paper demonstrate the difficulty for design innovation catalysts to adopt design through a limited amount of interventions from academia. Beyond the application of design process and tools, the challenge for them is to adopt a design mindset that is different to what they have learned and used so far, and to what they are surrounded with.

The proposed improvements made by the authors aim to reduce this strain by focusing further on the selection and orientation of the design innovation catalysts. Greater care should be given to ensure all stakeholders have a clear, consistent understanding of the purpose and expectations of each intervention and the overall curriculum before enrolling. Additionally, concentrating the program on explaining design as a mindset and approach to problems while staging the introduction of process and tools can limit the risks that DICs interpret design as a technical process to follow. Finally, this case study highlighted that further work needs to be done to better understand the most effective way to shape a cohort of industry-based design innovation catalysts who can successfully stimulate growth in their organisation by leveraging design, through a limited amount of interventions and face-to-face time.

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